

From: Ben Slivka  
Sent: Thursday, January 23, 1997 10:21 PM  
To: Mark Lucovsky  
Subject: FW: updated: \*proposed\* Microsoft API Strategy slides

Mark, long time no see!  
I've been learning about Java, and I've got what might appear to be a pretty radical proposal for Windows & Java.  
I would love to discuss this with you at your earliest convenience!  
I'm meeting with natbro, bshah, deb black Friday, 10:30-11:30, 26N/2179 - feel free to crash this meeting!  
Thanks, bens

-----Original Message-----

From: Ben Slivka  
Sent: Thursday, January 23, 1997 10:14 PM  
To: John Ludwig; Paul Gross; Bob Muglia; Brad Silverberg; Jim Allchin (Exchange); Nat Brown; Bharat Shah (NT);  
Deborah Black; Tod Nielsen; Brad Lovering; Jon DeVaan; Steven Sinofsky; Aaron Contorer; Thomas  
Reardon; Richard McAniff  
Subject: updated: \*proposed\* Microsoft API Strategy slides

Please feel free to send me any and all feedback.  
In contrast to my last attempt, this time I tried to answer the key questions up front.  
I understand the focus on Java may strike some as excessive, but I've been studying this issue for four months, and this  
is where my head is at today. Please fire away!  
Thanks, bens

  
API Strategy  
(1-24-97).ppt

Date: 1-24-02 Exhibit # 15  
Case: Sun vs. Microsoft  
Document: 1112  
Reported by: John A. Tomasko  
Naselli Reporting Corporation  
(800) 528-3335 FAX (503) 227-7123

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# Microsoft API Strategy: Java is our Destiny

bens

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# The Windows Platform

- ◆ Challenges
  - Maintain Windows marketshare and revenue
  - Surf the Java wave
- ◆ Opportunities
  - Improve software developer productivity  
(for our customers and ourselves!)
  - Position Windows for the 21st Century

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# Java is the Answer

- ◆ Java improves developer productivity
  - Java is to C/C++ as C is to ASM
- ◆ Java improves software scalability (client and server) for the 21st Century
- ◆ Java supercedes the DLL architecture of Windows
- ◆ Java is a wonderful opportunity to modernize and enhance Windows

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# Three Big Questions

- ◆ Will Java ever match the execution speed of C/C++? *we will get close*
- ◆ What about Cross Platform? *a red herring*
- ◆ Doesn't this make Windows a commodity (drive MSFT↓)? *no*

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# Java Execution Speed

- ◆ Issues:
  - Raw Java code speed
  - Garbage collection overhead
  - Overhead of calling Native OS services
- ◆ Solutions:
  - Optimizing Java compiler produces x86 code
  - Extensive GC work, Windows kernel changes
  - Rewrite some OS services in Java (AFC)
  - Simplicity of language permits sophisticated optimization and tuning (code and data Lego, whole program analysis)
  - May get "PCode" benefits (working set, load time)

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# Java Execution Speed (2)

- ◆ Real Data *we have lots of ideas to try*
  - LZX Decompressor (2.17 x slower)
    - 41.62 seconds -- C
    - 90.30 seconds -- Java
  - Garbage Collection
    - [need #s from pdussud]

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# What About Cross Platform?

- ◆ Application Foundation Classes run on any browser, OS, CPU, but are optimized for Win32
- ◆ This is a developer safety blanket for our customers and ourselves
  - Cross platform apps will never be as rich as Windows apps -- it's our job to ensure this tautology remains true!
- ◆ We need to do a better job of cross platform than our competitors!

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# Doesn't this Kill Windows?

- ◆ Windows is more than just an API set
  - Setup, device drivers, plug&play, installed base of applications, networking, utilities
  - At Home: Rich Multimedia is key, Windows and DirectX are the winners
  - At Work: Investment in Windows by end-users, IT groups, lots of Windows data
  - At Large: ISVs, Solution Providers, consultants, books, press, analysts, resellers
- ➔ Windows has awesome positive momentum

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## ... Kill Windows? (2)

- ◆ We will continue to enhance Windows in concert with Java
  - > MMX performance tuning
  - > Better and better multimedia
  - > P7 Java instructions (GC, array bounds, exception handling, ...)
  - > New native storage (???)
  - > Other new Windows services

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## ... Kill Windows? (3)

- ◆ 20th Century Windows was the result of our faith in the advantages of GUI and great execution
- ◆ 21st Century Windows *will be* a result of our faith in Java's architectural benefits and more great execution

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# Key Java Architectural Benefits

- ◆ No memory trashing
- ◆ Garbage collection
- ◆ Threading
- ◆ Security/Safety
- ◆ Versioning/Package Management
- ◆ RAD Tools

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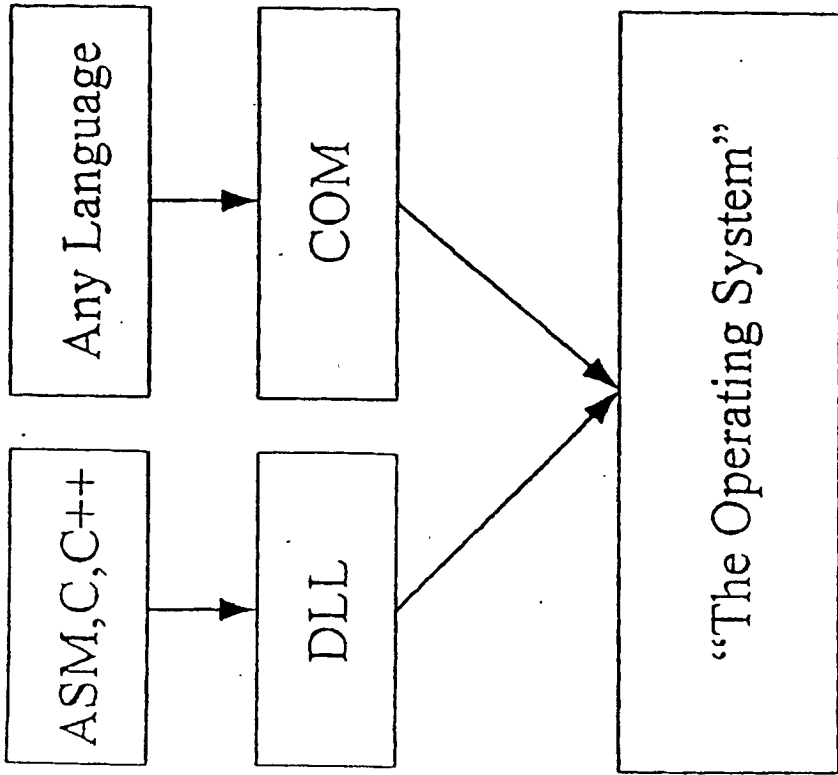
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# 20th Century Windows®



## GUI APIs

- > Win32
- > MFC
- > VB

## Problems

- > Pointers
- > Memory Trashing
- > Safety/Security
- > Reference Counting
- > Threading
- > Versioning

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# 21st Century Windows®

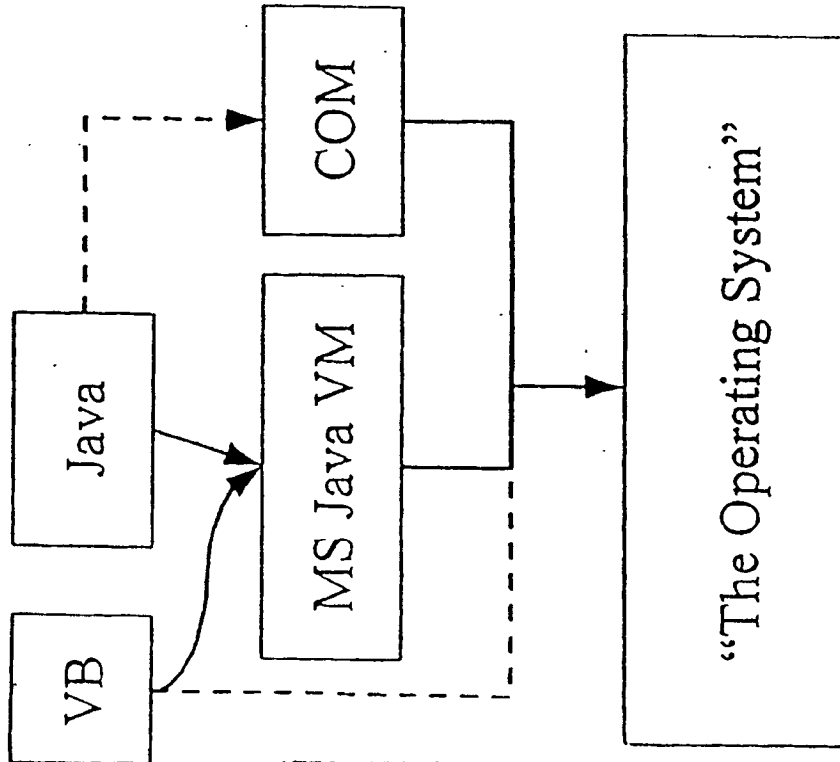
## GUI APIs are AFC

- > SGL (UI+FX)
- > Trident

## Benefits

- > No Pointers
- > Garbage Collection
- > Threading
- > Safety/Security
- > Versioning

Developer Productivity!!



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# Windows Memory Trashing

- ◆ Components in shared address spaces
  - Controls in the Windows shell (IE 4)
  - Controls in Active Server Pages
- ◆ Any large body of code written by multiple developers is at risk
  - What percentage of Windows, IE, Office, etc. bugs are memory trashing? How do you know that they are all gone?
- ◆ No pointers, array bounds checking, and type safety eliminate an entire class of programming errors

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# Garbage Collection

- ◆ Remove the hellish AddrRef/Release class of COM bugs (esp. circular reference!)
  - ◆ Simplify memory management
- BUT:** Lots of performance implications, have to do a lot of original work to make this real!
- ◆ PDussud working w/ToddK in Research and TBD in the Excel group and Windows kernel team

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# Threading

- ◆ USER + COM do not mix well
  - COM Apartment, Rental, and Free threading models vs. USER
- ◆ AFC (AWT) is free-threaded by design
  - Java language makes threading easy (synchronized)
  - GUI framework is designed for threading
  - Only one type of Bean (Java visual component)

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# Security/Safety

- ◆ Pointers require extreme measures
  - `pfn = (cast to pfn)12345678L;`
  - `(*pfn)(...); // Call off to anywhere`
  - Have to protect every entry point at that entry point
- ◆ Java Sandbox is much simpler
  - Simply restrict which entry points may be called, based on capabilities and permissions
- ◆ Boon to Client and Server code

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# Versioning/Package Management

- ◆ Java permits more flexible, efficient code distribution
  - Incremental code download (per-class basis)
  - No fixed v-tables (resolved at load time)
  - [get more from MikeTout]

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# RAD Tools

- ◆ Simplicity of Java vs. C++ means...
  - Java compiler is 20x faster
  - “Edit and Continue” is easy to do
  - Whole Program Analysis is possible
  - “Two-Way” (GUI<->Code) tools
- ◆ Combine the best of VB/VC++ tools
- ◆ Standard Java classes (threading, exceptions, lists, hash tables, ...)

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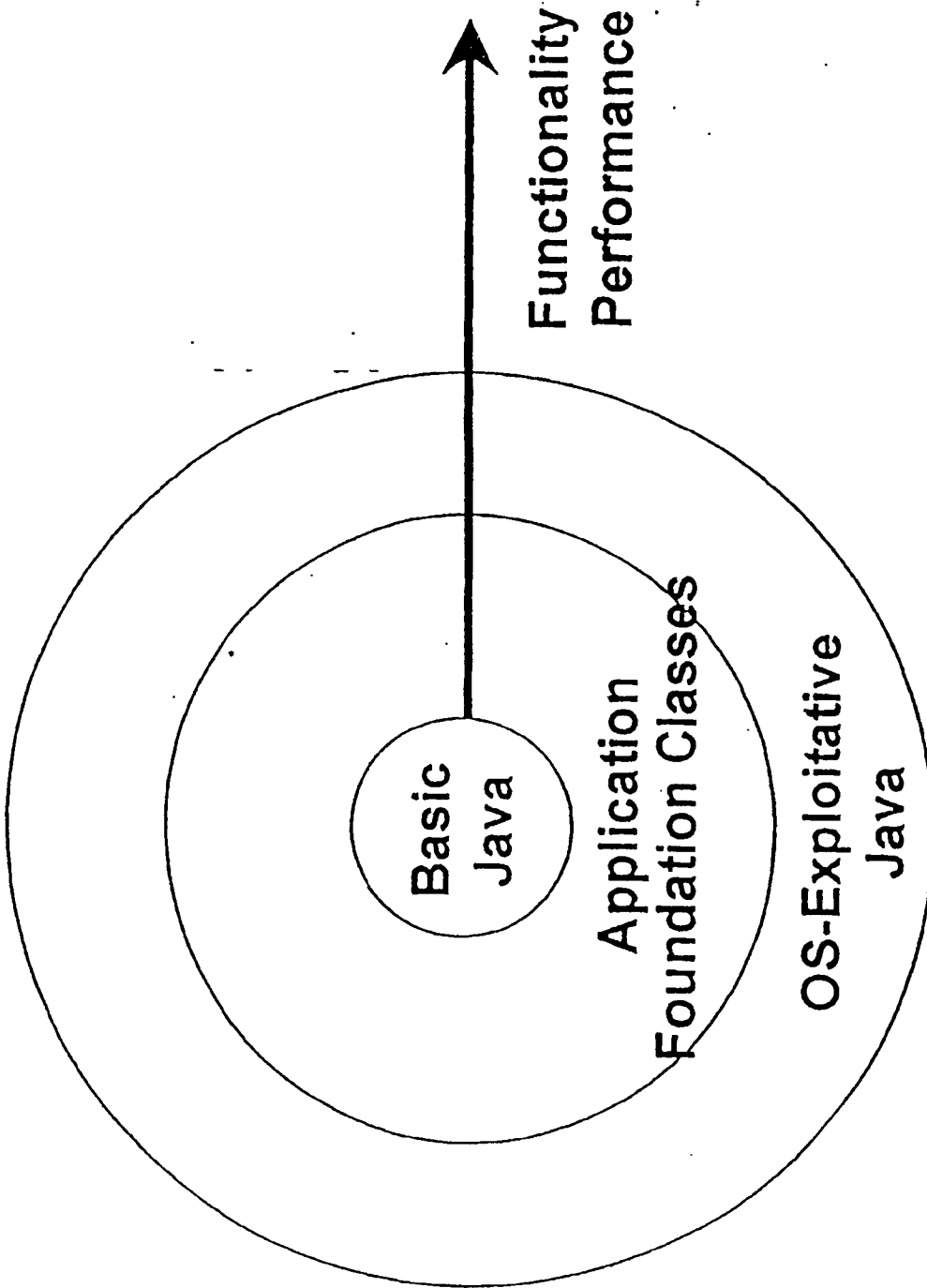
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# AFC == Cross Platform



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# Application Foundation Classes

- ◆ Cross OS, CPU, Browser (written in Java)
- ◆ UI and FX = SGL (Standard GUI libraries)
  - Bring richness & familiarity of Windows GUI programming to Java developers
  - Fully compatible with AWT
- ◆ Dynamic HTML (Trident)
- ◆ Multimedia Classes (DirectMedia)
- ◆ Redistributable by ISVs

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# More Questions

- ◆ What is the big deal about Trident?
- ◆ When do I use SGL vs. Trident?
- ◆ When do I use VB vs. Java?

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# Why Dynamic HTML?

- ◆ Supercedes VB form package
- ◆ 2D Multimedia Run-time
- ◆ Much richer, easier GUI framework
  - No more WM\_PAINT
- ◆ Separates presentation from control
- ◆ Single document format
  - Point of integration for productivity components

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# SGL vs. Dynamic HTML

- ◆ SGL is for traditional GUI programming
  - Easier, Richer than USER+GDI, MFC, QuickDraw, NextStep, IFC, AWT, etc.
- ◆ Dynamic HTML is next-generation GUI
  - Much richer behavior
  - Painting built-in and super optimized
  - Multimedia
  - In 3 years, Dynamic HTML apps will be cooler than SGL apps
  - (Take all this on faith for now...)

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# VB vs. Java

- ◆ VB
  - Is simpler than Java
  - Millions of people know VB
  - But has a variety of “wierdnesses”
- ◆ Java
  - Is more expressive than VB
  - Scales to larger programs
  - Much “cleaner” language
- ◆ Both will compile to the Java VM

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# API Transition to Java

- ◆ New APIs biased toward Java
  - Typically exposed via COM, or implemented in Java
- ◆ For existing APIs
  - Redesign for (and implement in) Java (e.g., MAPI) -or-
  - Thin (COM) wrapper

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# What if we ignore Java?

- ◆ Someone else will execute on the above strategy (Sun)
- ◆ JavaOS comes along (on low-end devices?), runs these Java apps (which are easier/faster to write!)
- ◆ Windows becomes irrelevant in bigger and bigger sections of the market
- ◆ Microsoft has no choice, we must seize control the Java platform!

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# Summary

- ◆ Java Architecture (no pointers, GC, threading, security, versioning) makes Windows the leading platform for the 21st Century
- ◆ Dynamic HTML is the next generation GUI class library
- ◆ Learn Java Now, and start preparing for the future!

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# Backup Slides

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# Overview

- ◆ Java leadership is our Destiny
- ◆ Java: Language of the Future
- ◆ AFC (Application Foundation Classes)
- ◆ Java/VB/VC interoperability
- ◆ Write Java/Trident apps
- ◆ Spur Windows innovation
- ◆ Action Items
- ◆ Issues

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# Java Leadership: our Destiny

- ◆ We had three choices:
  - Windows all the way, no cross-platform
  - Take Win32 cross platform, use Colusa
  - Embrace and Extend Java
- ◆ Provide the best Java technology
  - Best VM, Best Classes, Best Tools
- ◆ Make developers successful
  - Best way to write x-platform code
  - Best way to write Windows code

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# Java/VB/WC Interop

- ◆ Developers must be able to gradually migrate to Java
- ◆ Our Java must make it very easy to incorporate non-Java code
- ◆ VB and MFC are the dominant Windows API

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# Write Java/Trident Apps

- ◆ Motivation
  - Build real Java/Trident programming expertise
  - Feedback to improve Java and Trident platforms
- ◆ Obvious candidates:
  - Mail/News
  - FrontPage
  - Java tools

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# Spur Windows Innovation

- ◆ Cannot rest on our laurels
- ◆ Add more, compelling, Win32-only APIs
- ◆ Add value beyond APIs, too
- ◆ TCO (for corporations)
- ◆ Simpler HW/SW (for homes)
- ◆ Leverage MS Research?

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# Action Items (1)

- ◆ JimAll: expose Win32 features to Java (either thin layer, or Java-ized)
- ◆ PGross/BenS: Focus Java tools efforts, esp. Native Code, GUI construction
- ◆ BenS: "Port" Trident to Java
- ◆ BradSi: drive Java+Trident app development (e-mail, FrontPage, ???)
- ◆ JimAll: raise the ante on Windows end-user features

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## Action Items (2)

- ◆ TodN: communicate developer roadmap
- ◆ PGross: Java/VB/Vc interop
- ◆ YuvalN/BenS: Move VB to Java VM
- ◆ CharlesF: Drive Java Standardization
- ◆ RobWell: Unify AFC UI/FX w/Trident
- ◆ DanLi/SteveSi: Research future Trident UI metaphors
- ◆ JohnLu/JimAll: ActiveX Security

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## Action Items (3)

- ◆ JohnLu: Define Java Mail/News Classes
- ◆ DavidV: Define Java DB Classes
- ◆ PGross/BenS: Tool to help migrate MFC/C++ to AFC/Java
- ◆ PGross: Integrate/Unify client-centric and server-centric tools
- ◆ ErichAnd/BenS: Legal guidelines/plan
- ◆ RichT/JonRo: promote unique Win32 capabilities

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# Issues

- ◆ Java OS?
- ◆ More Win16 Java effort (JIT, etc.?)
- ◆ How to engage w/Intel?
- ◆ Developer messages: Java, VB, C++
- ◆ Can we reduce number of languages (Java, VB, VBScript, JScript)?
- ◆ Colusa?

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